



*Ministero dei Trasporti  
e della Navigazione*

UNITÀ DI GESTIONE  
MOTORIZZAZIONE E SICUREZZA DEL TRASPORTO TERRESTRE  
- MOT 2 -

**Rome, 18/1/2000**

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**IHRA Working Group on Advanced Offset Frontal Crash Protection.**

Please find here enclosed the minutes of the sixth meeting of the Working Group, held in Delft on 16-17<sup>th</sup> November 99.

Sincerely yours,

Claudio Lomonaco

## **INTERNATIONAL HARMONIZED RESEARCH AGENDA (I.H.R.A.)**

**Rome, 18/1/2000**

### **STATUS REPORT ON THE ADVANCED OFFSET FRONTAL CRASH PROTECTION GROUP**

**(Based on the results of the meeting held in Delft on 16-17th November 1999)**

**Participants:** C. Lomonaco (Chairman, Ministry of Transport of Italy), R. Lowne (EEVC), A. Lie (EEVC), A Hobbs (IHRA Compatibility), P O'Reilly (IHRA, Compatibility), T. Hollowell (NHTSA), P. Fay (ACEA/OICA), E. Gianotti (Secretary of the Group).

#### ***INTRODUCTION***

#### **MEETING IN S.DIEGO OF COMPATIBILITY GROUP**

Mr. O'Reilly: summarised briefly the last meeting of IHRA compatibility group (San Diego 28-29 October). Doc. IHRA-AFC 25, where main conclusion are reported, has been distributed among the members. During the meeting some difficulties have been raised in considering the mobile barrier (MDB) as an essential prerequisite to the control of compatibility. The MDB seems, at this stage, to be devoted much more to "self protection" of vehicles. The observed overriding and alignment problems have not been yet solved.

Lomonaco: confirmed the need of a two steps approach for the new proposal on frontal crash protection.

EEVC: endorse a two steps approach too. If in the first step it will be not possible involve compatibility we will focus on a self protection philosophy.

#### ***DISCUSSION ON THE AGENDA OF THE MEETING***

##### **1. Extension to vehicle of category N1 (1<sup>st</sup> step)**

Members confirmed their points of views stated in the former meeting of Berlin (see last minute).

##### **2. Type of barrier (1<sup>st</sup> step – 2<sup>nd</sup> step)**

EEVC: presented inf.doc.no.IHRA/AFC-26.which had been originally prepared for the IHRA Compatibility WG to identify the questions for which this frontal WG required advice. According to this document, which concern factors affecting the relative merits of fixed and Mobile Deformable offset barriers for frontal impact protection, taking into account Compatibility aspects, the delegate reported briefly the contents and its point of view:

The possible improvements of the present barrier adopted by the EC Commission has been focused potentially on the Mobile Deformable Barrier (MDB). The present Offset Deformable Barrier (ODB) presents some flaws which affect the reproducibility of real crashes. First it is not possible for the ODB to replicate the correct velocity change ( $\Delta V$ ) and the energy absorption for the target car simultaneously for the same impact severity. The second disadvantage is that no account is taken of the advantage seen for heavier cars when considering other cars. Thirdly, only the effects of collinear impacts can really be evaluated by a fixed barrier.

A fixed mass mobile barrier would take into account the mass ratio effect and would allow the “correct” velocity change ( $\Delta V$ ). A MDB offers the opportunity of performing a frontal impact angle. An angled impact is also seen as being more demanding with consequentially greater potential benefits.

Anyhow MDB poses different problems, such as the repeatability for the test procedure and may lead to vehicle designs optimised for the selected angle, unless the test procedure specified a range of angles. This could be hardly difficult for European Regulation to achieve type approval.

Moreover MDB to car impacts have demonstrated that there seems to be an overriding effect from the MDB that may be unrealistic. Therewith EEVC confirms own position stated the last meeting. Namely, for the time being the trolley does not introduce significant advantages.

### **3. Impact speed (1<sup>st</sup> – 2<sup>nd</sup> step)**

EEVC: the impact speed of 65km/h seems to be the solution much more devoted to self protection of vehicles, based on accident analyses. On the other hand, there is some concern that this value could lead to stiffer cars. Therefore a 60km/h test should be more advisable in absence of extra data. When further clues will be available, 65km/h would be reconsidered.

NHTSA: Toward this aim, the delegate of the agency summarized the related aspects of the proposed new STD208, i.e., addressing the related content of the recently published SNPRM at this item. With respect to the goal of improving protection, NHTSA is proposing to adopt one of the following alternative crash tests to evaluate the protection of unbelted occupants in moderate to high speed crashes, i.e., those that are potentially fatal. One alternative is an unbelted rigid barrier test (perpendicular and up to  $\pm 30$  degrees oblique to perpendicular) with a maximum speed to be established in the final rule within the range of 40 to 48 km/h (25 to 30 mph). If the maximum speed will be reduced to 40km/h (25mph) permanently, it might also increase the maximum speed of the belted rigid barrier test from the current 48km/h to 56 km/h (30 to 35 mph). Another alternative is an unbelted offset deformable barrier test with a maximum speed to be established in the final rule within the range of 48 to 56km/h (30 to 35 mph). The vehicle would have to meet the requirements both in tests with the driver side of the vehicle engaged with the barrier and in tests with the passenger side engaged.

AUSTRALIA: even though the delegate was not present at the meeting, he has made to know to the group that his position still remain as in the last meeting:

Australia would support an increase of the test speed to 60 km/h as a first step. Australia would advocate considering the effects on compatibility before reaching any conclusion about raising the test speed above 60 km/h.

### **4. Performance criteria (1<sup>st</sup>-2<sup>nd</sup> step)**

EEVC: A preliminary consideration of this has been made, in relation to the accident data base analysis. It was necessary to identify the target group and EEVC has decided that this should adults occupants down to 12 years old.

Lomonaco: proposed to submit the doc.22a, drafted by mr. Lowne to the compatibility group.

EEVC: specified that the group has to select the injury criteria according to the accident severity. After this revision we could send it to the compatibility group for endorsement and then to the biomechanic group as a consequence.

NHTSA: will inform by March the decision of the agency concerning the tightened up criteria of 50% dummy and others.

## **5. Air-Bag performance (1<sup>st</sup> – 2<sup>nd</sup> step)**

Lomonaco: informed that the hearing damage caused by airbags is a problem in the agenda of GRSP/UN ECE in Geneva. A proposal submitted by the Swiss delegation has been presented to that group and discussion are in progress.

NHTSA: In the SNPRM, with the goal of minimizing the risks of air-bags in low speed crashes, the agency again proposed performance requirements to ensure that future air-bags do not pose unreasonable risk of serious injury to out-of-position occupants. NHTSA again proposed to adopt a number of options for complying with those requirements so that vehicle manufacturers would be free to choose from a variety of effective technological solutions and to develop new ones if they so desire. With this flexibility, they could use technologies that modulate or otherwise control air bag deployment so deploying air bags do not cause serious injuries, technologies that prevent air bag deployment if children or out-of-position occupants are present, or a combination thereof.

## **6. Impact angle (2<sup>nd</sup> step)**

EEVC: confirmed concerns over problems such as repeatability for the test procedure which may anyway lead to vehicle designs optimised for the selected angle, unless the test procedure specified a range of angles.

NHTSA: has included a moderate speed offset test in the SNPRM and has regulatory plans to propose a high speed offset test next year as part of the agency's effort for stage 1. The intention of the agency for the stage 2 MDB test is to focus on 30°, as all the studies for the time being support that angle. However, an angle less than 30° might be more representative. The 30° angle was derived through the coarseness of the PDOF coded in the agency's NASS analytical file. More recently, the NASS file has been updated to include the calculated PDOFs, thereby allowing for examining angles at various increments. The agency has initiated further studies to more accurately evaluate and justify a narrower angle.

## **7. Trolley (2<sup>nd</sup> step)**

EEVC: have no further comments about the table (concerning the Trolley based Frontal Offset Impact Test procedure). The delegate stated that no development on the issue of the trolley has been carried out, according to difficulties concerned by ground interaction effects for the stationary target car case, which will be enhanced by overriding with effect on the accuracy. Further problems would be the dimension of the test site, the way to record the test. Furthermore it is suspected that the lower the speed of the trolley, higher the effect of drifting against the car is.

NHTSA: The agency will present a paper of test at 25mph, namely a test with low speed pulse to help the discussion on this issue.

## **8. Compatibility issues (due to different approach of crash tests of Europe and US).**

EEVC: From considerations of compatibility the trolley seems to be inferior and more toward self-protection. At the moment EEVC is against an angled approach. This does not mean that EEVC will dismiss it, simply the agency is not working on it at the moment because it does not involve sufficiently compatibility. At this aim studies with overload tests with ODB are in progress.

As far as the present delegates know, also Japan has not carried out significant research on it. Australia is interested in compatibility and MDB but no tests have been carried out.

#### Conclusion

A simple test is advocated. The group is in favour of improving self protection in a way that does not make compatibility worse.

#### **9. Comparative analyses method (concerning the Trolley-based Frontal Offset Impact Test Procedure).**

It was agreed that the conclusions of the S.Diego meeting (AFC – 25) sufficiently represent the debate on this item.

#### **10. Collateral effect of Air-Bag explosion.**

The issue has been already discussed at item 5 of the agenda.

#### **Conclusion**

A next meeting in Madrid by INSIA has been agreed. A joint meeting with the compatibility group is scheduled before that of the group as follows:

2 – 3 (morning) February 2000: Joint meeting

3(afternoon) – 4 February: Frontal Crash Protection Meeting

**List of documents distributed during the meeting.**

- **IHRA/AFC 25 IHRA compatibility group – Main points from discussion of MDB at meeting in S.Diego (28 and 29 ottobre 1999)**
- **IHRA/AFC 26 Fixed vv Mobile Deformable Barrier**
- **IHRA/AFC 27 A new generation of seat belt reminder systems**
- **IHRA/AFC 28 Frontal impact test configurations – Potential common approach phase I.**
- **IHRA/AFC 29 Response to review of Potential Test Procedures for FMVSS No.208, sept.1998 by Office of Vehicle Safety Research, NHTSA. (Distributed by e-mail after the meeting).**